

REMARKS

Claims 11-15 are in the present application.

Claim 11 has been amended to recite in paragraph d) that applicants' graphite electrode extends *substantially* around the inner electrode so as to receive radial electric current therefrom and, per paragraph h), means are provided to *stir the melt non mechanically* by imposing magnetic field lines across such radial electric current to impart a stirring force to the melt... Support for the above two amendments are found, e.g., in Figures 2 & 4 and the related specification of the present application and no new matter has been added.

The Office Action rejection of claims 11-13 as obvious under 35 U.S.C. 103 a) over Tomzig et al. ('170) in view of Linares et al. ('304) is respectfully traversed. Tomzig teaches an apparatus, per his Figure 2, in which melt in a crucible 1 is mechanically rotated in the presence of a static magnetic field and an alternating magnetic field to stabilize and dampen convective melt flows in the rotating crucible 1, per col. 4, lines 43 et seq.

The Office Action recognizes, near the top of page 3, that Tomzig does not teach an inner elongated electrode and an outer electrode of graphite and a means for applying a voltage thereacross. So the Office Action turns to the Linares patent of ('304) and finds that he teaches an electrode 20 may be inserted into a melt and a voltage applied between such electrode (anode) and a cathode 18 positioned vertically below in contact with boat 10, per Linares Figures 1 & 2, so as to suppress impurity incorporation into the melt 14.

The Office Action states that the combination of Tomzig et al. and Linares does not teach the intended use of the means for applying voltage across the two electrodes but says that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed apparatus herein and the prior art structure assembled from the above 2 patents.

But there is a structural difference. That is, Linares teaches a vertical electric flow from anode 20 to cathode 18 in his Figure 2 (i.e., the current will take the shortest path through the boat 10 to the cathode 18) so that no sidewise stirring can result from such flow of current. Also, the Linares boat does not substantially surround the Linares electrode 20 so as to receive radial current therefrom to provide a stirring structure.

In contrast, applicants claims 11 et seq. define a structure where a cathode holds conductive melt therein and substantially surrounds an elongated anode therein, which

permits electric current to flow radially from the anode through the melt and across magnetic field lines to such cathode to stir the melt, without mechanical means, all as illustrated in applicants' Figures 2 & 4.

If one combine the Linares and Tomzig patents, one has a structure with an elongated anode 20 of Linares inserted into the crucible 1a of Tomzig, which is made of a dielectric, i.e., quartz glass per column 5, line 65 of Tomzig. So there is nothing stirring with this prior art combination. Of course, there is no suggestion of adding an intangible stirring means to Tomzig as he already has a mechanical means 3 for spinning crucible 1, per his Figure 2.

Thus, applicants provide a novel structure wherein an elongated electrode is substantially surrounded by a hollow electrode which can contain melt, which structure by application of electric and magnetic fields can stir such melt without the complications of installing, powering and maintaining a mechanical stirrer.

That is, the above two prior art patents in combination do not suggest the structure of one electrode inserted into a larger electrode, with substantial surround, with melt added and magnetic and electric fields applied, to arrive at applicants' claimed apparatus per claims 11 et seq. herein, unless one resort to hindsight reconstruction, which does not establish obviousness, in *In re Civitello* 144 USPQ 10.

The Office Action says that Linares teaches a graphite boat 10 that is at least partially around the inner electrode 20 and that an electric field would occur between electrodes, i.e. the boat and the inner electrode 20. However, as noted above, the current flows between anode 20 and cathode 18, shorting out any significant side flow to the graphite boat 10 of Linares. A short-out path is not present in applicants' apparatus, per claims 11 et seq., as the elongated inner electrode does not approach a nearby anode but generates a radial electric current that flows sidewise to its substantially surrounding graphite electrode.

It is noted also that claims 14 & 15 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten.... However, in view of the above amendments to claim 11, which are believed to bring further clarity thereto, and in view of the limitations of the combined prior art references, that amended claim 11 may now be in condition for allowance over the applied art so as to impart novelty to its dependent claims 12-15 and obviate the need to rewrite claims 14 & 15.

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Finally, it seems that the 2nd Amendment to claim 11, above, in paragraph h), adds an actual element of the claimed apparatus which cannot be dismissed as a mere intended use since it is an integral part of such claimed apparatus. That is, it provides a means to stir the melt without having to install a mechanical stirrer. Accordingly, it is believed that claim 11 defines an apparatus having a structure not suggested by the combined Tomzig & Linares patents.

In view of the foregoing, the claims of record, as amended, are believed distinguished over the applied art and in condition for allowance.

Respectfully submitted,



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